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tached to the under side of boulders that have a cavity beneath them, and is well adapted to the aquarium, where it very soon becomes perfectly at home, and expands almost constantly. Inhabiting the same region with this there is another more rare species of *Sagartia*,* which is duller in color and less graceful in form, which lives buried up to its tentacles in gravel.

Besides the species already described, there are several others that are less conspicuous, which inhabit the New England coast, several of which live buried in sand or mud, like many worms, and only protrude their tentacles at the surface. These kinds are usually long and slender, and taper at the base instead of having a flat adhesive disk. Farther southward on the Carolina coast there are several other peculiar species, some of them beautifully colored, and also several species of true corals, the animals of which closely resemble the Sea-anemones in structure and habits. One pretty species of coral† is even found on the southern coast of New England. This is found just below low-water mark, encrusting stones and shells, and forming little irregular masses of coral, covered with star-like cells or cups, which are about an eighth of an inch across. The polyps, which in life rise above these stellate cups, are colorless and almost transparent, resembling, in nearly all respects, miniature *Actinias*. This coral lives well in confinement, and feeds readily upon bits of oyster, in the same manner as the Sea-anemones.

THE MARINE AQUARIUM.

BUY at any glass-shop a cylindrical glass jar, some six inches in diameter and ten high, which will cost you from three to four shillings; wash it clean, and fill it with clean

* *Sagartia modesta* Verrill. Described with the preceding species.

† *Astrangia Danæ* Agassiz.

salt-water, dipped out of any pool among the rocks, only looking first to see that there is no dead fish or other evil matter in the said pool, and that no stream from the land runs into it. If you choose to take the trouble to dip up the water over a boat's side, so much the better.

So much for your vase ; now to stock it. Go down at low spring-tide to the nearest ledge of rocks, and with a hammer and chisel chip off a few pieces of stone covered with growing sea-weed. Avoid the common and coarser kinds (fuci) which cover the surface of rocks ; for they give out under water a slime which will foul your tank ; but choose the more delicate species which fringe the edges of every pool at low-water mark ; the pink coralline, the dark purple ragged dulse (*Rhodymenia*), the Carrageen moss (*Chondrus*), and, above all, the commonest of all, the delicate green *Ulva*, which you will see growing everywhere in wrinkled fan-shaped sheets, as thin as the finest silver paper. The smallest bits of stone are sufficient, provided the sea-weeds have hold of them ; for they have no real roots, but adhere by a small disk, deriving no nourishment from the rock, but only from the water. Take care, meanwhile, that there be as little as possible on the stone beside the weed itself. Especially scrape off any small sponges, and see that no worms have made their twining tubes of sand among the weed-stems ; if they have, drag them out, for they will surely die, and as surely spoil all by sulphuretted hydrogen, blackness, and evil smells.

Put your weeds into your tank, and settle them at the bottom, which last some say should be covered with a layer of pebbles ; but let the beginner leave it as bare as possible, for the pebbles only tempt cross-grained annelids to crawl under them, die, and spoil all by decaying ; whereas if the bottom of the vase is bare, you can see a sickly or dead inhabitant at once, and take him out (which you must do) instantly. Let your weeds stand quietly in the vase a day or two before you put in any live animals ; and even then, do

not put any in if the water does not appear perfectly clear ; but lift out the weeds, and renew the water ere you replace them.

Now for the live-stock. In the crannies of every rock you will find sea-anemones (*Actiniæ*) ; and a dozen of these only will be enough to convert your little vase into the most brilliant of living flower-gardens. There they hang upon the underside of the ledges, apparently mere rounded lumps of jelly ; one is of a dark purple, dotted with green ; another of a rich chocolate ; another of a delicate olive ; another sienna-yellow ; another all but white. Take them from their rock ; you can do it easily by slipping under them your finger-nail, or the edge of a pewter spoon. Take care to tear the sucking base as little as possible (though a small rent they will darn for themselves in a few days, easily enough), and drop them into a basket of wet seaweed ; when you get home, turn them out into a dish full of water and leave them for the night, and go to look at them to-morrow. What a change ! The dull lumps of jelly have taken root and flowered during the night, and your dish is filled from side to side with a bouquet of chrysanthemums.

Let your *Actiniæ* stand for a day or two in the dish, and then picking out the liveliest and handsomest, detach them once more from their hold, drop them into your vase, right them with a bit of stick, so that the sucking base is downwards, and leave them to themselves thenceforth.

*Actinia Dianthus** you may find adhering to fresh oysters in any dredger or trawler's skiff, a lengthened mass of olive, pale-rose, or snow-white jelly. The rose and the white are the more beautiful ; the very maiden-queens of all the beautiful tribe. If you find one, clear the shell on which it grows of everything else (you may leave the oyster inside if you will), and watch it expand under water into a furbeled flower, furred with innumerable delicate tentacula ; † and, in the centre, a mouth of the most brilliant orange ;

* On our shores it is rarely met with. It resembles *A. marginata* very closely.—EBS.

† See Gosse's Aquarium, Plate 5, p. 192.

altogether one of the loveliest gems, in the opinion of him who writes, with which it has pleased God to bedeck his lower world.

But you will want more than these anemones, both for your own amusement and the health of your tank. Microscopic animals will breed, and will also die; and you need for them such scavengers as our friend *Squinado*. Turn, then, a few stones which lie piled on each other at extreme low-water mark, and five minutes' search will give you the very animal you want,—a little crab, of a dingy russet above, and on the underside like smooth porcelain. His back is quite flat, and so are his large angular-fringed claws, which, when he folds them up, lie in the same plane with his shell, and fit neatly into its edges. Compact little rogue that he is, made especially for sideling in and out of cracks and crannies, he carries with him such an apparatus of combs and brushes as Isidor or Floris never dreamed of, with which he sweeps out of the sea-water at every moment shoals of minute animalcules, and sucks them into his tiny mouth. Mr. Gosse will tell you more of this marvel, in his *Aquarium*, p. 48.

Next, your sea-weeds, if they thrive as they ought to do, will sow their minute spores in millions around them; and these, as they vegetate, will form a green film on the inside of the glass, spoiling your prospect; you may rub it off for yourself, if you will, with a rag fastened to a stick, but if you wish at once to save yourself trouble, and to see how all emergencies in Nature are provided for, you will set three or four live shells to do it for you, and to keep your subaqueous lawn close mown.

That last word is no figure of speech. Look among the beds of sea-weed for a few of the bright-yellow or green sea-snails. For the present, they will only nibble the green *ulvæ*, but when the film of young weed begins to form, you will see it mown off every morning as fast as it grows, in little semicircular sweeps, just as if a fairy's scythe had been at work during the night.

And a scythe has been at work; none other than the tongue of the little shell-fish; a description of its extraordinary mechanism (too long to quote here, but which is well worth reading) may be found in Gosse's *Aquarium*, p. 34.

A prawn or two, and a few minute starfish, will make your aquarium complete; though you may add to it endlessly, as one glance at the salt-water tanks of the Zoölogical Gardens and the strange and beautiful forms which they contain, will prove to you sufficiently.

You have two more enemies to guard against, dust and heat. If the surface of the water becomes clogged with dust, the communication between it and the life-giving oxygen of the air is cut off; and then your animals are liable to die, for the very same reason that fish die in a pond which is long frozen over, unless a hole be broken in the ice to admit the air. You must guard against this by occasional stirring of the surface (it should be done once a day if possible), and by keeping on a cover. A piece of muslin tied over will do; but a better defence is a plate of glass, raised on wire some half-inch above the edge, so as to admit the air. I am not sure that a sheet of brown paper laid over the vase is not the best of all, because that, by its shade, also guards against the next evil, which is heat. Against that you must guard by putting a curtain of muslin or oiled paper between the vase and the sun, if it be very fierce, or simply (for simple expedients are best) by laying a handkerchief over it till the heat is past. But if you leave your vase in a sunny window long enough to let the water get tepid, all is over with your pets. Half an hour's boiling may frustrate the care of weeks. And yet, on the other hand, light you must have, and you can hardly have too much. Some animals certainly prefer shade, and hide in the darkest crannies; and for them, if your aquarium is large enough, you must provide shade, by arranging the bits of stone into piles and caverns. But without light, your sea-weeds will neither thrive, nor keep the water sweet. With plenty of light you will see,

to quote Mr. Gosse once more (p. 259), "thousands of tiny globules forming on every plant, and even all over the stones, where the infant vegetation is beginning to grow; and these globules presently rise in rapid succession to the surface all over the vessel, and this process goes on uninterruptedly as long as the rays of the sun are uninterrupted.

"Now these globules consist of *pure oxygen*, given out by the plants under the stimulus of light; and to this oxygen the animals in the tank owe their life. The difference between the profusion of oxygen-bubbles produced on a sunny day, and the paucity of those seen on a dark, cloudy day, or in a northern aspect, is very marked." Choose, therefore, a south or east window, but draw down the blind, or throw a handkerchief over all if the heat become fierce. The water should always feel cold to your hand, let the temperature be what it may.

Next, you must make up for evaporation by *fresh* water. A very little will suffice, as often as in summer you find the water in your vase sink below its original level, and prevent the water from getting too salt. For the salts, remember, do not evaporate with the water, and if you left the vase in the sun for a few weeks, it would become a mere brine-pan. — *From Kingsley's Glaucus, or the Wonders of the Shore.*

A FEW SEA-WORMS.

BY A. S. PACKARD, JR.

OUR sea-side readers may simply shrug their shoulders in disgust at the prospect of becoming acquainted with creatures unfortunate enough to possess a few "poor relations," who have brought, either by their uncanny looks or disagreeable habits, disrepute upon the whole class of worms. We wish to put in a plea for the worm. Hear our evidence,